

Sustainable business investment to advance livestock health and productivity in Sub-Saharan Africa: the African Livestock Productivity & Health Advancement (A.L.P.H.A.) initiative

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SUMMARY

Livestock are an essential asset to rural communities, and the health of livestock is critical for achieving food security in regions where there is exceptionally high incidence of livestock and human disease. Sub-Saharan Africa (SSA) has amongst the highest human population growth rates in the world, with five-fold growth in Tanzania projected by 2100. Livestock productivity therefore must be improved by overcoming existing constraints to the livestock health sector, including: lack of access to quality veterinary medicines and products, poor rural extension services, limited sustainability of diagnostics services, and low education regarding animal health. Zoetis, the global animal health leader, partnered with the Bill & Melinda Gates Foundation through a \$14.4M business development grant with a key focus on sustainable improvement of livestock production in SSA. In the focal countries of Nigeria, Uganda, and now Tanzania and Ethiopia, the African Livestock Health and Productivity Advancement (A.L.P.H.A.) initiative centres around three central pillars namely; Veterinary Medicines & Services, Training & Education, and Veterinary Laboratory networks. Empowerment of the veterinary profession is a key component of our aim to demonstrate the value of animal health to farmers, particularly through encouraging business acumen and highlighting the importance of correct and responsible use of veterinary medicines. After successful launch activities in Nigeria and Uganda, we seek to continue our approach in Tanzania to focus on partnerships with important distributors, veterinary laboratories, and other key contributors to the supply chain to work towards common goals engineered for future growth and longevity.

Keywords: Productivity, Sub-Saharan Africa, livestock, sustainability, diagnostics

INTRODUCTION

Whilst there is a global trend of falling hunger levels, undernourishment levels in Sub-Saharan Africa are in fact rising (FAO 2014a). Over half of the 300 million people who live on \$1 per day in Sub-Saharan Africa depend on livestock, which provides up to 45% of the total family income (Heifer International, 2014). Livestock are of enormous importance, not only for ensuring food security and providing an income, but for also providing traction, manure, social status and economic services such as insurance and guarantees. Improvement in agriculture is the key to poverty reduction in Africa, with growth in agriculture nearly 3 times more effective than other sectors (World Bank, 2008). Despite the fact that agriculture is currently the biggest employer of active labour (Heifer International, 2014), existing farming methods are not sufficient to meet the production projections required to meet the needs of the rapidly growing population. Improvement of milk production and expansion of poultry farming in African regions is believed to be

essential to meet the required production outputs required, however without suitable investment and intervention these projections are highly unlikely to be realized. One of the biggest problems limiting livestock productivity is the high incidence of animal disease which threatens food security for the fragile communities which rely on them. Animal diseases are estimated to incur economic losses of USD\$ 2 billion per year (African Union, 2013). For these reasons, animal health is extremely important in contributing to the UN's Sustainable Development Goals in Africa (United Nations, 2018).

Although significant progress has been made over the years by NGOs in advancing livestock farming in Africa, there is still a market failure that prevents the availability, accessibility and affordability of veterinary diagnostics, medicines and vaccines. Despite the evidence of willingness to pay for veterinary interventions in African countries the limitations of the existing veterinary system is a significant barrier to international companies (such as

Zoetis) investing in the region without an easily quantifiable return on investment. For this reason, there is a very limited portfolio of currently registered veterinary products available in the region, which in turn greatly limits the capability of local veterinarians and NGO efforts. For example, there is presently only one Zoetis veterinary product licensed in Ethiopia. The lack of product availability is partly due to the differing registration requirements for each individual country, as well as the lack of a suitable distribution network to facilitate product sales in these regions.

As a result of the failing animal health sector, there is also widespread under-reporting of animal disease with over 99.8% estimated losses under-reported (ILRI, 2012). The lack of veterinary outreach services for diagnostic sample and data collection, and the lack of available disease interventions results in little incentive to make disease reporting worthwhile. In the absence of a suitable animal health infrastructure, it is very difficult for governments and NGOs to direct limited funds to the most suitable disease interventions. Without compliance with international animal health regulations through disease surveillance and control policies, the potential to increase business growth of the livestock sector in the future will also be prevented by export restrictions blocking access to international markets.

Through this pioneering initiative, Zoetis will make substantial progress to address the issue of lack of continuous access to quality veterinary medicines, and also improve correct and responsible medicine use through the improved availability of animal health diagnostics and focused education – thereby helping reduce avoidable losses in livestock production due to diseases.

SUSTAINABLE BUSINESS DEVELOPMENT IN SUB-SAHARAN AFRICA

About the A.L.P.H.A. Initiative

The A.L.P.H.A. initiative arose through the shared vision of Zoetis and the Bill & Melinda Gates' Foundation to invest in driving improvements to the animal health sector in

Sub-Saharan Africa (SSA) with sustainability at the forefront of all investment. We recognise that many agricultural donor programs may create dependency on grant funding due to the rapid expansion of short-term projects which are largely infrastructure and training centred, but with a sustainability shortfall as after the projects cease there are no operational funds to continue the activities and no continued investment to facilitate future growth.

We recognise that improvement in these high-risk markets will not happen overnight; however we believe that grant investment in a sustainable strategy will de-risk business activities in volatile markets in the short-term, and prosper growth in the medium to long-term.

This collaboration resulted in a \$14.4M 3-year grant being awarded to Zoetis by BMGF in 2017, with matched co-investment by Zoetis, for the initial focal countries of Uganda, Nigeria and Ethiopia (Zoetis, 2017). We recently have agreed to extend the initiative to a 5-year period, which will also now include Tanzania.

Our innovative strategy aims to improve sustainable business development in the animal health sector and advance livestock productivity through the reduction of major livestock diseases. All these are projected to be achieved by implementing six key objectives. First is to have an improved availability of veterinary medicines through novel product registrations to extend the number of veterinary treatments available for livestock diseases including possible adaptation of product packaging/ volume to ensure affordability and practicality for the smallholder market; second is the development of a certified local distributor network including distributor training to ensure correct and responsible veterinary product use; third is to have organised outreach services for rural communities to improve medicalization rates of livestock, and deliver community education regarding animal disease to demonstrate the potential of animal health to maximize profitability of smallholder farming; fourth is to develop veterinary laboratory networks delivered in conjunction with local partners to improve the correct diagnosis of major livestock production diseases and increase correct and responsible use of veterinary products; fifth is empowerment of local veterinary stakeholders with professional


development/business training courses and support for local veterinary associations; and lastly the outcomes of research studies to demonstrate the value of improved animal health and return of investment for local communities, with results communicated in educational resources designed for maximum accessibility for local farmers.



Throughout this initiative, Zoetis will collaborate with local stakeholders including governmental authorities, local veterinary associations, national and international NGOs, farmers associations, private sector distribution companies, and the World Organization for Animal Health (OIE) to ensure maximum positive and sustainable impact to the focal regions.

Key learnings and Strategy

During the kick-off of the A.L.P.H.A. initiative in Uganda, Nigeria and Ethiopia, round-table meetings were held which centred on the main themes of Veterinary Medicines and Services, Veterinary Laboratory Networks, and Training & Education. Key stakeholder groups participated in these structured discussions in Nigeria (n=38), Uganda (n=40) and Ethiopia (n=12). The representations includes but not limited to those from: regulatory bodies, national and private laboratories, distributors of veterinary products, veterinary associations, farmers and farmer associations, meat processors, and universities. The key issues highlighted for each theme are listed in (Table 1), alongside some key strategic outcomes which have been incorporated into initiative activities.

Table 1. Key issues highlighted during round-table meetings in Uganda, Nigeria & Ethiopia, and subsequent strategic outcomes of the A.L.P.H.A. initiative

Theme	Key issues highlighted	Strategic outcomes
 VETERINARY MEDICINES AND SERVICES	<ul style="list-style-type: none"> • Slow & complicated product registration process: which varies significantly country per country – this is a limiting factor for investment in bringing new products to SSA (delays of >3 years in some countries). • Ongoing legislative changes: Registration processes lack transparency and are subject to regular changes (ongoing harmonisation exercises in East and West Africa will simplify processes in the long-run). • Governance of regulatory authorities: Human and animal regulatory activities are in most cases governed by the same entity, so veterinary products take second priority. • High presence of fraudulent products / ‘quackery’: It is very difficult distinguish between genuine and fake products, and farmers are drawn to the cheapest (often fake) product which yields poor results. As a result, farmers do not see value of veterinary intervention. • Easy availability of prescription drugs through agro-shop outlets: This undermines the need for veterinary diagnosis and often results in incorrect administration/ selection of veterinary products which accelerates resistance issues (e.g. widespread acaricide resistance in Uganda). • Lack of variety of available drugs: e.g. hormones, and antibiotics which limits capacity for health intervention/ improvement. • Cold-chain issues in supply chain: Power-cuts are very frequent in SSA, and therefore it is difficult to ensure that temperature-sensitive products have had a consistent cold-chain until the end user. This issue is heightened when transporting products to the end-user in remote rural locations. • Lack of rural veterinary services: Community animal health workers (CAHWs) and para-vets are often the first line responders for livestock; veterinarians often focus mainly on more profitable companion animal work in densely populated areas, consult over the phone without seeing the animal, or work in other professions. • Nomadic livestock management style: The nomadic nature of herdsmen makes locating & serving livestock difficult for diagnostics, product supply and veterinary services. 	<ul style="list-style-type: none"> • Partnership with drug authorities in A.L.P.H.A. regions to identify governmental registration priorities and expedite registration / commercial import licenses where possible • Design of a distributor certification and training scheme to ensure correct product handling, enable onward training of agro-shop suppliers regarding the importance of cold-chain maintenance, and provide traceability for the supply for genuine Zoetis products. • Investigate cold-chain provider partnerships for improving local cold-chain transport of products to the end-user. • Encourage entrepreneurialism in the veterinary profession through business training & CPD to expand business opportunities serving rural livestock communities • Focus location of livestock services on main stocking routes for strategic delivery of services & supply of medicines • Investigate local re-packing possibilities by distributors in accordance with global quality standards and local taxation regulations. • Partnership with veterinary associations to improve communication, training and networking within the veterinary

	<ul style="list-style-type: none"> • Limited empowerment of veterinary professionals: The availability of veterinary medicines without a prescription diminishes demand for veterinary services, and therefore veterinarians often work in more profitable professions. Regular continued veterinary development (CPD) training is not required in most SSA countries. • Large product pack-sizes are unaffordable to small-scale farmers: Many animal health pharmaceuticals and vaccines are packaged in large doses (e.g. >2000 birds) to increase cost-efficiency for commercial farms and maximise margins; however this contradicts needs of small farmers who cannot afford large pack sizes when living in subsistence lifestyles. 	profession/
 VETERINARY LABORATORY NETWORKS	<ul style="list-style-type: none"> • Low sustainability of public services: government labs often have grant income which can result in strong investment into infrastructure, but with shifting short-term priorities and lack of funds for routine services and business continuity. • Free-of-charge mind-set for veterinary services: The mind-set of receiving free (and often unavailable) diagnostics for notifiable diseases needs to be overcome to enable sustainable offering of higher quality diagnostic services relating to productivity diseases. • Low private-public laboratory collaboration: There is low communication and coordination between laboratories which leads to wastage of funds and duplication/contradiction of efforts. There is high divergence between public & private labs; learning from each other could improve versatility and sustainability of services. • Low availability of point-of-care (POC) diagnostics: Improving POC diagnostic capability would empower vets and make diagnostics a more useful tool for immediate diagnosis for productivity diseases. Even basic tools such as ultrasound pregnancy scanners and microscopes are scarce. • Logistics failure of samples to laboratories: difficulties transporting samples in hot climates over long distances to laboratories are a barrier to submitting samples for testing. FTA cards and PCR testing with strategic sample collection points could help overcome some of these issues with pathogen transport. • Slow sample turnaround: Low staffing due to strikes means test turnaround and result feedback is often too late for disease intervention in the patient. • Registration of diagnostics' kits is required in some countries: for example in Ethiopia; this hampers the ability to import diagnostics and is subject to registration delays. 	<ul style="list-style-type: none"> • Focus on diagnostics for productivity diseases rather than notifiable diseases, through handling in-activated samples which removes necessity for expensive high-biosecurity facilities and doesn't contradict efforts of national laboratories. • Partnership with key private production partners to deliver sustainable diagnostic services with strong links to the supply chain (e.g. Chi Farms Ltd. in Nigeria and Uganda Meat Producers Cooperative Union Ltd.) • Encourage sustainability from the outset by developing a pricing model and business plans with diagnostics partners. • Networked approach rather than one centrally equipped laboratory to better serve local farmers in strategic locations. • Invest in more POC solutions rather than fewer high capital pieces of equipment which would have lower accessibility. • Awareness creation through marketing materials and educational content to highlight the importance and value of diagnostics. • Develop electronic results feedback system for laboratory partners to improve the efficiency of service.
 TRAINING AND EDUCATION	<ul style="list-style-type: none"> • Lack of education available to farmers regarding correct and responsible product use: There is very little education provided at point-of-sale at the agroshop, and farmers with low literacy struggle to read complex labels with usage directions and indications. Farmers therefore tend to lean towards brands they already know or have used before (even if not suitable for the same indication). • Lack of continued professional development within the veterinary sector, para-vets and CAHWs: It is therefore difficult to ensure a high standard of training since qualification, and training rapidly goes out of date. This is particularly important in relation to anti-microbial resistance recommendations and research, and for keeping a competitive edge. • Few business-related training and diagnostics training modules offered at veterinary school: To instil best practice it will be more effective to incorporate better diagnostics training and business modules into undergraduate training, especially 	<ul style="list-style-type: none"> • Delivery of business training and CPD training through partnerships with local veterinary associations. • Deliver Train-the-trainer programmes for farmers through outreach teams to train farmers on animal health. • Production of educational content to provide at point-of-sale at the agroshops which is designed for low literacy. • Affiliation with veterinary universities to provide diagnostics and business training at undergraduate level. • Partnership with NGO training providers to integrate animal

	<p>due to the lack of CPD training after qualification.</p> <ul style="list-style-type: none"> • No training requirements for agro-shop sellers: Better regulation of sellers dispensing veterinary medicines would result in better advice and recommendation being provided to the farmer. At present, there is no recognised education or framework for agro-shops across SSA. • Farmer training often lacks animal health training: Basic training schemes provided by NGOs tends to focus on nutrition, basic care, housing and breeding, but have limited content pertaining to health, diseases and treatment of livestock – particularly for productivity diseases. 	health modules into existing training networks.
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DISCUSSION: BUILDING A SUSTAINABLE MODEL

With human populations of SSA growing so rapidly, it follows suit that the livestock populations will also rise rapidly – which presents opportunity for expansion of the animal health market in SSA. For example, Nigeria, which possesses the largest overall African livestock population of 143 million chickens and 134 million ruminants (FAOSTAT, 2015) is predicted to have a human population larger than the United States by 2050 (United Nations, 2017). However the current production system yields a shortfall of 60 million tonnes of chicken and 1.4 million tonnes of milk (FMARD, 2016), which presents a severe food security issue for the required productivity growth trajectory to support the future population. The efficiency of the current SSA production systems therefore has to improve, and a key aspect of this is to reduce animal disease as a limiting factor.

Veterinary Products and Training

Throughout the A.L.P.H.A. initiative, we will be registering over 40 new veterinary products per country which will greatly increase the range of high-quality disease interventions available to farmers. The regulatory processes which differ in each country are a large barrier to progress in SSA – which results in long delays and high registration costs for each individual country, which at the moment don't justify the commercial returns without grant investment. There is promise that the East African Harmonisation and the ECOWAS (Economic Community of West African States) will simplify regulatory processes (NEPAD, 2009; GalvMED, 2018), but these are still in progress and regular engagement with authorities is essential.

One of the biggest hurdles we face collectively in the animal health market is to demonstrate

the added value and return on investment that improved animal health will bring to smallholder farmers. This is difficult to quantify in low productivity small-scale farming systems; yet small-scale farming is the most prevalent form of agriculture globally (Samberg *et al.*, 2016; FAO, 2014b; Herrero *et al.*, 2012). For example, there is limited research to-date in small-scale African markets to demonstrate the monetary and social benefits of prevention of disease through vaccination – which then often results in treatment of acute disease without diagnosis, which is often too little too late. We aim to counteract this research gap by conducting Outcomes Research studies in focal SSA markets for key veterinary products of high importance to small-holder farmers.

One of the key differences between SSA and more developed markets is an extremely limited veterinary infrastructure available to serve small-scale livestock farmers. The lack of veterinary input combined with readily accessible veterinary medicines (often provided without a prescription through agrosops) is contradictory to demonstrating the value of improved animal health – as if medicines are used incorrectly then they will fail to improve animal health (offering no return on investment), and may even compound disease issues through drug resistance. An example of this is in Uganda, where acaricide resistance is a key problem blighting rural farmers largely driven by un-informed treatment without diagnostics, and incorrect dilution of sprays and dips (Vudriko *et al.*, 2017) – which has resulted in a government taskforce enlisted to focus on the crisis (National Drug Authority, 2012). We believe that empowerment of the veterinary sector is very important to increase availability of veterinary services to farmers in a sustainable manner, and to also spur improvements to national drug regulatory authorities to encourage correct and responsible dispensing and use of veterinary drugs to preserve their

value for years to come. For this reason, we are supporting local veterinary associations through the A.L.P.H.A. initiative to help them elevate communication to practicing vets, and encourage regular CPD and business training to expand career development.

Veterinary Laboratory Networks

Diagnostics are a key facet underpinning correct and responsible use of veterinary medicines for disease intervention, and also in the demonstration of value of improved animal health. However the majority of veterinary diagnostic services are provided by public veterinary laboratories which tend to centre on notifiable diseases which are reportable to the OIE (OIE, 2018). National laboratories offer key services for the detection and surveillance of notifiable diseases which impact trade between counties, but they tend to lack routine services suitable for endemic production diseases and they are also subject to operational budget shortages and regular staffing issues. As a result, there is a service gap in offering of timely and efficient diagnostics for livestock production diseases with subsequent recommendation of appropriate disease interventions.

In order for sustainable and high-quality laboratory services to be provided for production diseases, we believe that private laboratory services are essential – and as a result we are working with key actors in the value chain to set-up or reinforce existing laboratory services in A.L.P.H.A. countries. The logistical collection and transport of diagnostics is a challenge which we hope to improve via selection of partners with strategic connections to the production chain; for example we have partnered with Chi Farms Ltd. in Nigeria (the biggest supplier of day old-chicks) and the Uganda Meat Producers Cooperative Union Ltd. (UMPCU) (Zoetis, 2018a). Another key element of our approach is to utilise a network of laboratory partners rather than one centrally highly-equipped laboratory, in order to maximise geographical coverage and provide cost-effective basic diagnostic services which were not previously accessible. We hope to also increase the availability of point-of-care diagnostics through partnership and training of veterinarians.

Training and Education

Training and education is essential to improve livestock animal health, care and welfare; however there are many stakeholder tiers to consider, including: Distributors & agro-shops, Veterinarians, Para-vets and CAHWs, and Farmers (from commercial farmers down to small-holders). Training content therefore must be tailored to fit the right audience, in the most accessible manner – with sustainability in mind. A dedicated outreach team has been hired in Uganda and Nigeria, who have been tasked with producing and disseminating educational content to support animal health and veterinary medicine use in conjunction with local partners using the Train-the-Trainer approach. As examples, we have delivered training in partnership with the AFOS Foundation in Nigeria for smallholder poultry farmers (Zoetis, 2018b). As we are in a rapidly evolving digital era, the possibility for regular learning through the internet helps overcome the challenges of large distances to travel to attend sessions and also the dissemination of hard-bound resources which quickly become out-dated. However although mobile technology use is rising rapidly within individuals of higher education status (Pew Global, 2018) it still presents a barrier for farmers of low literacy. For this reason, farmer training videos have been produced for dissemination by the outreach teams and local partners, and pictogram-type visual guides will be produced to help overcome literacy barriers for Zoetis veterinary products.

The complexity and necessity of training and education required to support new/ existing veterinary medicines alongside diagnostics and demonstrate their value in improving animal health in SSA markets is one of the key reasons that grant funding and a dedicated initiative is required to support business expansion in SSA, as commercial returns presently do not warrant the level of investment required to support sustainable animal health development in the region.

Further expansion to Tanzania

Following the recent successful launch of the A.L.P.H.A. initiative in Uganda and Nigeria through development and refinement of a model

we believe will greatly contribute to sustainability of animal health services, we took the decision with BMGF to extend the original grant by an additional two years (to help maximise impact due to the long registration timeframes which delays introduction of new products) and to also include Tanzania alongside Ethiopia in Phase 2. Tanzania is expected to have five-fold population growth by 2100 (United Nations, 2017), and it is presently ranked third in Africa for cattle stocks with 26.7 million cattle at the last official recording in 2015 (FAOSTAT, 2015). Improving animal health is a governmental priority through the Livestock Masterplan (LMP) to contribute to on-farm profitability, ensure food quality and safety, and enhance the international competitiveness of Tanzania's livestock and livestock products (CGIAR, 2017) – for these reasons we believe that the A.L.P.H.A. initiative would have positive impacts on the region. We have made a promising start by signing initial partnership with a new distributor S & J Animal Tech Ltd represented by Mr Shanel Ngowi who will be integral in the distribution of Zoetis veterinary medicines and diagnostic products, and the registration process for new products is currently underway. We will shortly be expanding activities in Tanzania and Ethiopia and will be looking for suitable partners to deliver the core A.L.P.H.A. activities as discussed in this paper.

SUMMARY

In summary, we believe that generating essential improvement to livestock production systems will require a systems-wide approach, and there is no single solution; collaboration along the supply chain with key partners in a sustainable manner is critical. Market-led business-driven initiatives, which integrate learnings from best practice in other countries, are likely to be the most efficient and successful model for making sustainable improvements to the productivity system. The model requires a flexible approach for highly dynamic animal health environments in these markets, as well as collaborations of high integrity to help deliver sustainable business potential.

In the words of Clint Lewis (Vice President, Zoetis International): *“In terms of sustainability, food security, desertification as a result of climate change and so on, animal health is*

crucial in mitigating some of the effects. Healthy animals create healthy food. Healthy food creates healthy people. Within the Gates Foundation framework, Zoetis is not going to address climate change. But dynamic weather and other external factors create / increase animal disease further and accentuate the food insecurity challenge – that’s where we come in. What we can control is the focus on healthy animals because climate issues make the situation much more pronounced, further compromise animal health and create further challenges for the farmers. That’s why it’s so critical for us to work with these countries in order to create a process conducive to embracing and quickly approving the correct medicines to help support local farmers and vets to create healthy animals.”

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